2023 Preliminary PJM Load Forecast

Load Analysis Subcommittee
November 29, 2022

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Resource Adequacy Planning

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Methodological Improvements

- Itron Report
  - https://www.pjm.com/-/media/committees-groups/subcommittees/las/2022/20220912/pjm-model-review-final-report-from-itron.ashx

- Key model changes
  - Monthly sector models
  - Hourly forecast model

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Model Parameters

- Estimation Period: January 2013 through August 2022
- Weather Simulation: 1993 to 2021 (377 scenarios)
- Sector Models (2012-2021 Monthly from EIA 861 and EIA 861m)
  - End Use Data: Based on Itron's 2022 release
  - Economics: September 2022 vintage from Moody's Analytics
- IHS Solar/Battery Forecast (zonal & peak allocation by PJM)
  - Production estimates by UL
- Plug-in Electric Vehicles (PEVs)
  - State targets and EIA 2022 AEO for non-target states
- Forecast Adjustments – Data Centers (AEP, APS, Dominion); NRBTMG to DR (AEP, ATSI, PL); Peak Shaving Adjustment (EKPC)

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Heating/Cooling/Other

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- Heat/Cool/Other are driven by Sector (Residential/Commercial/Industrial) models. Sector model results are influenced by two factors.
  - Economics
    - Residential – Households, Personal Income, Population per household
    - Commercial – Employment, Population, Output
    - Industrial - Output
  - End-use (saturation/efficiency/intensity)
    - Residential
    - Commercial
    - Industrial

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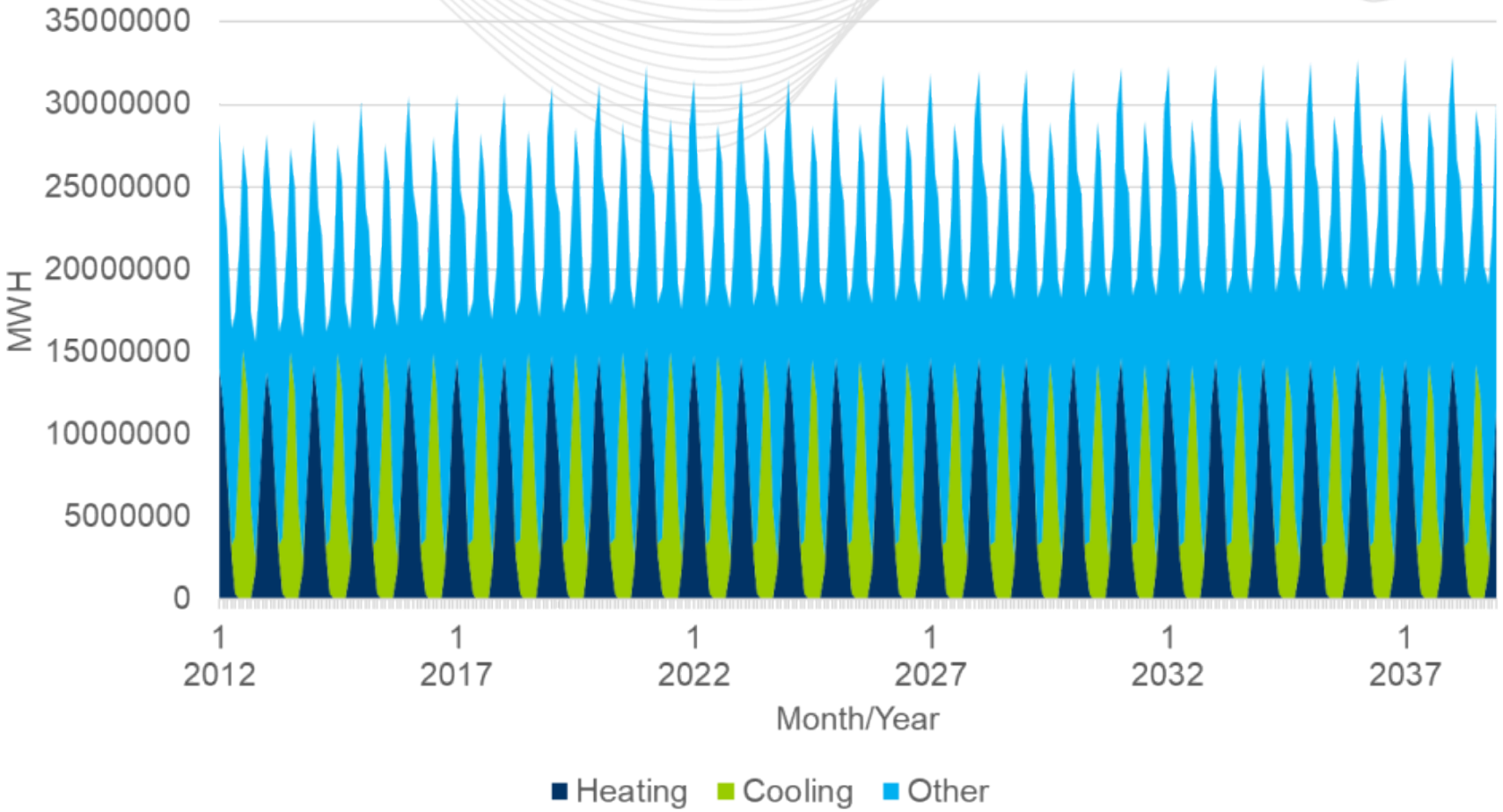
Residential



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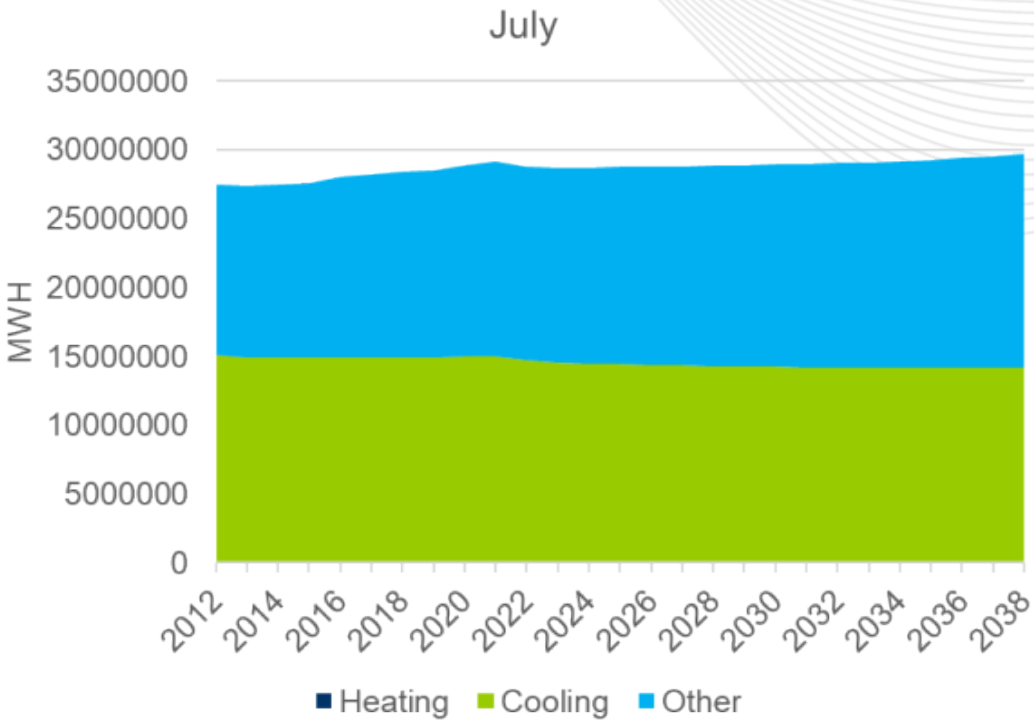
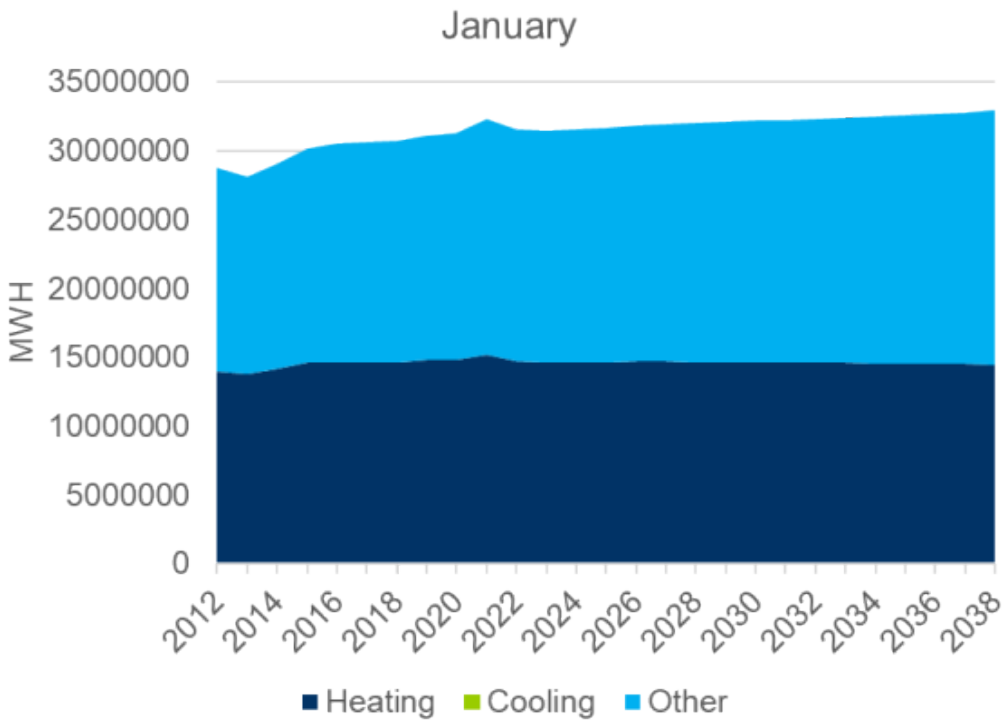
Residential





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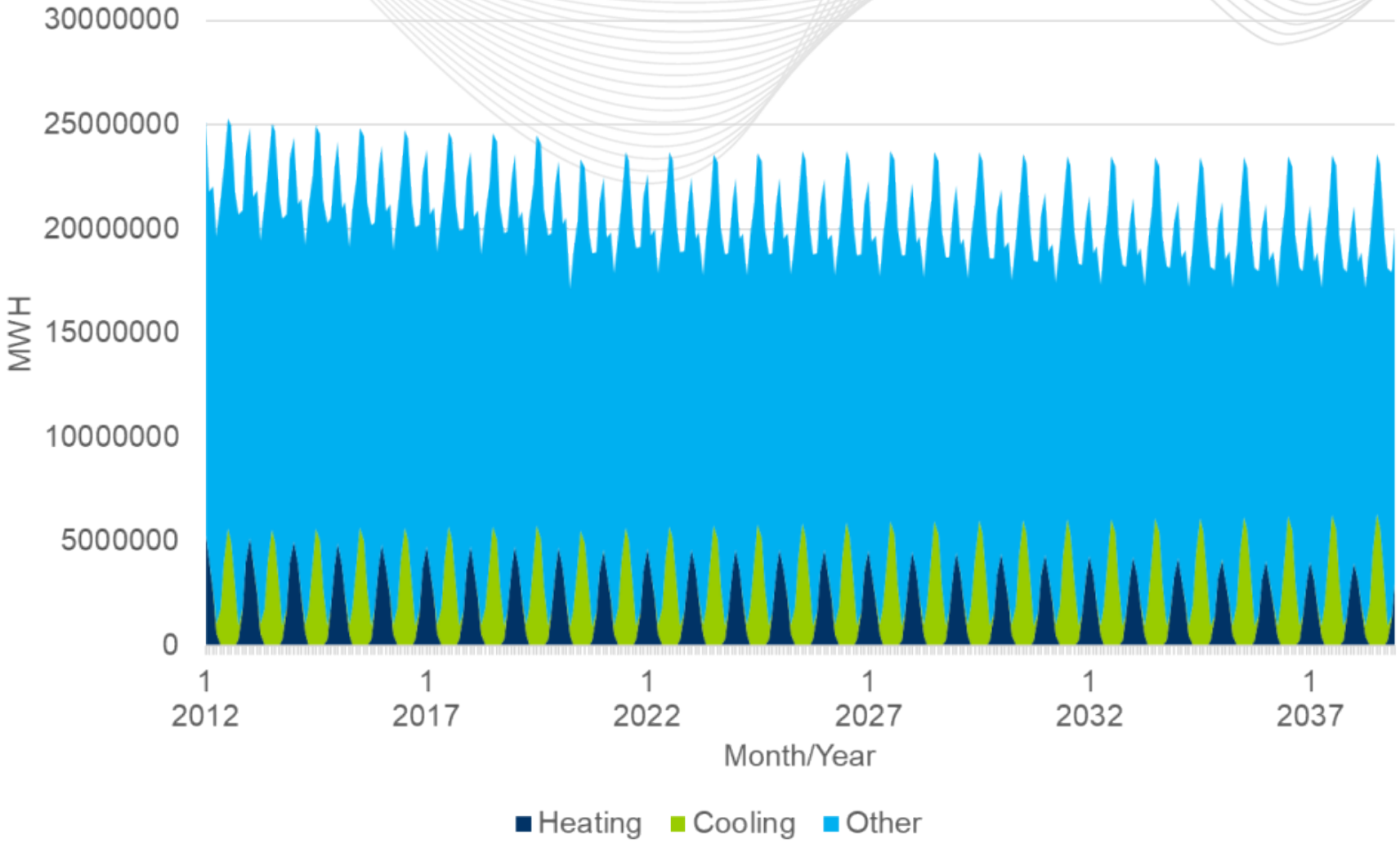
Commercial



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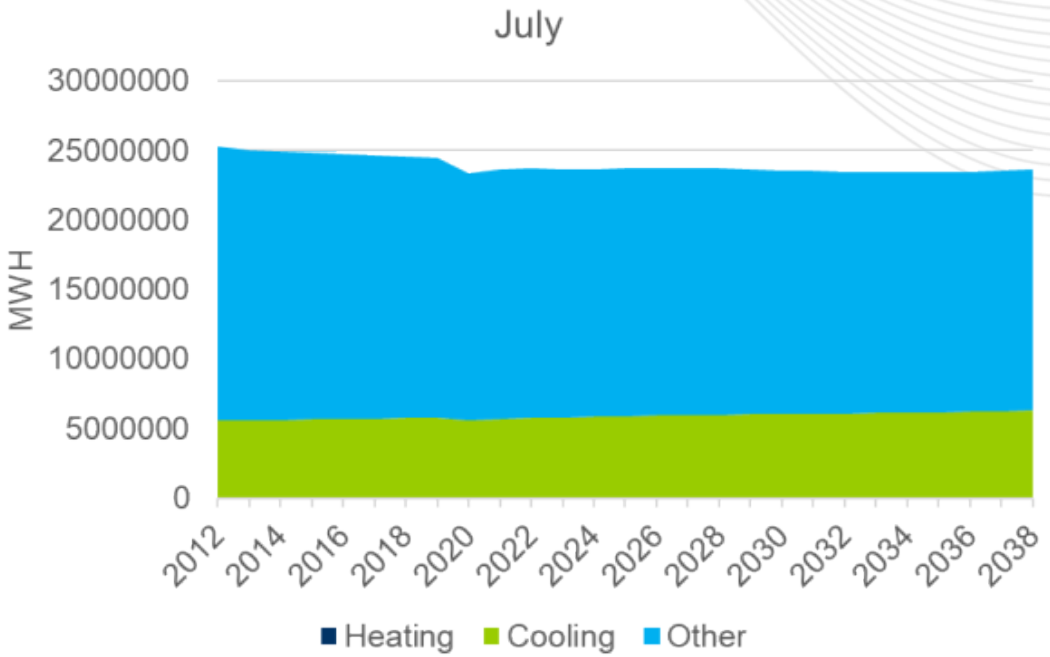
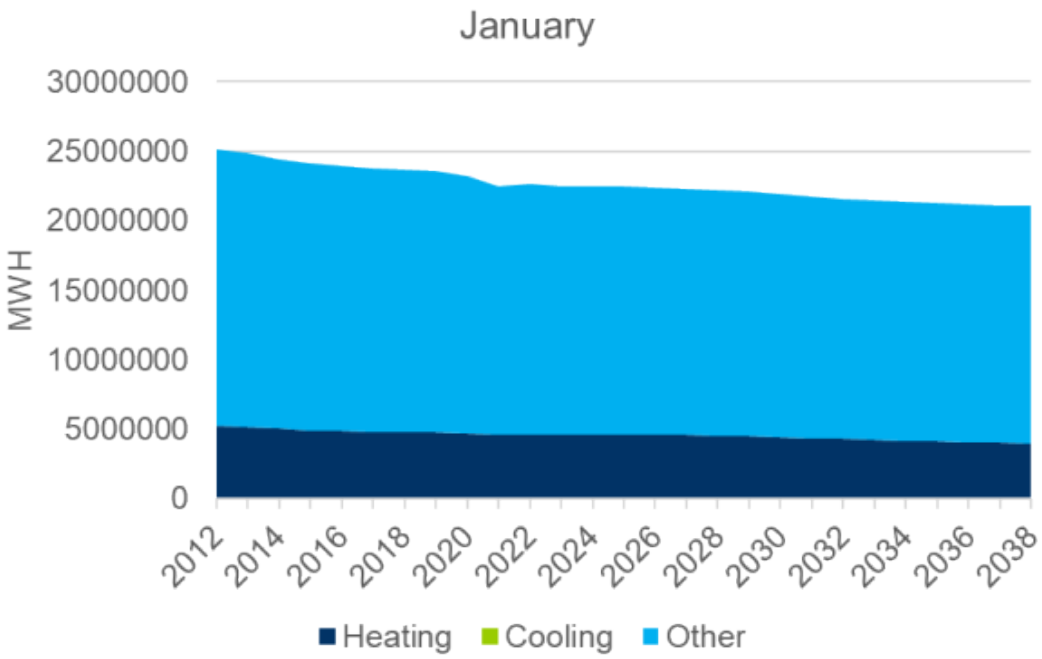
Commercial





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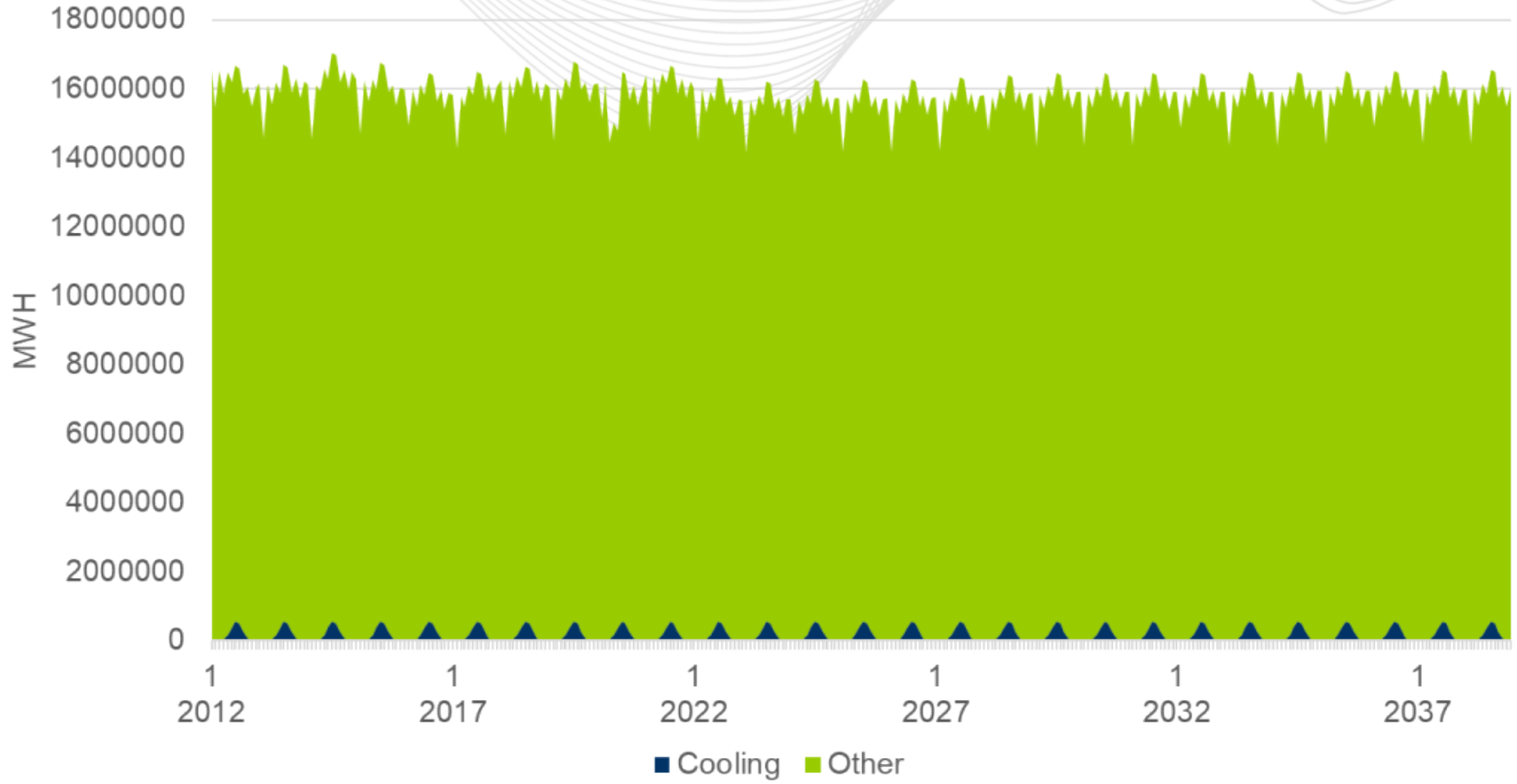
Industrial



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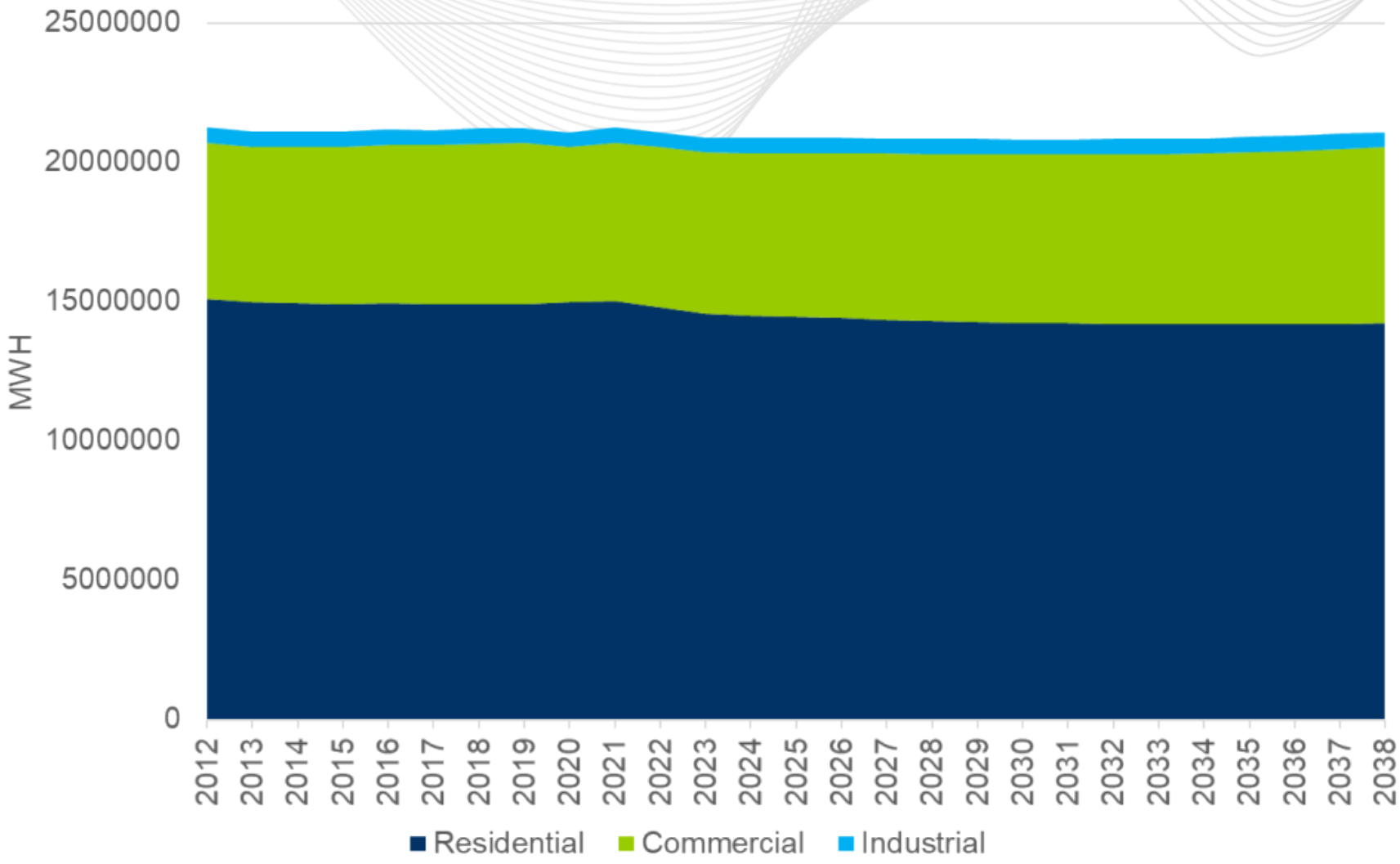
Cooling



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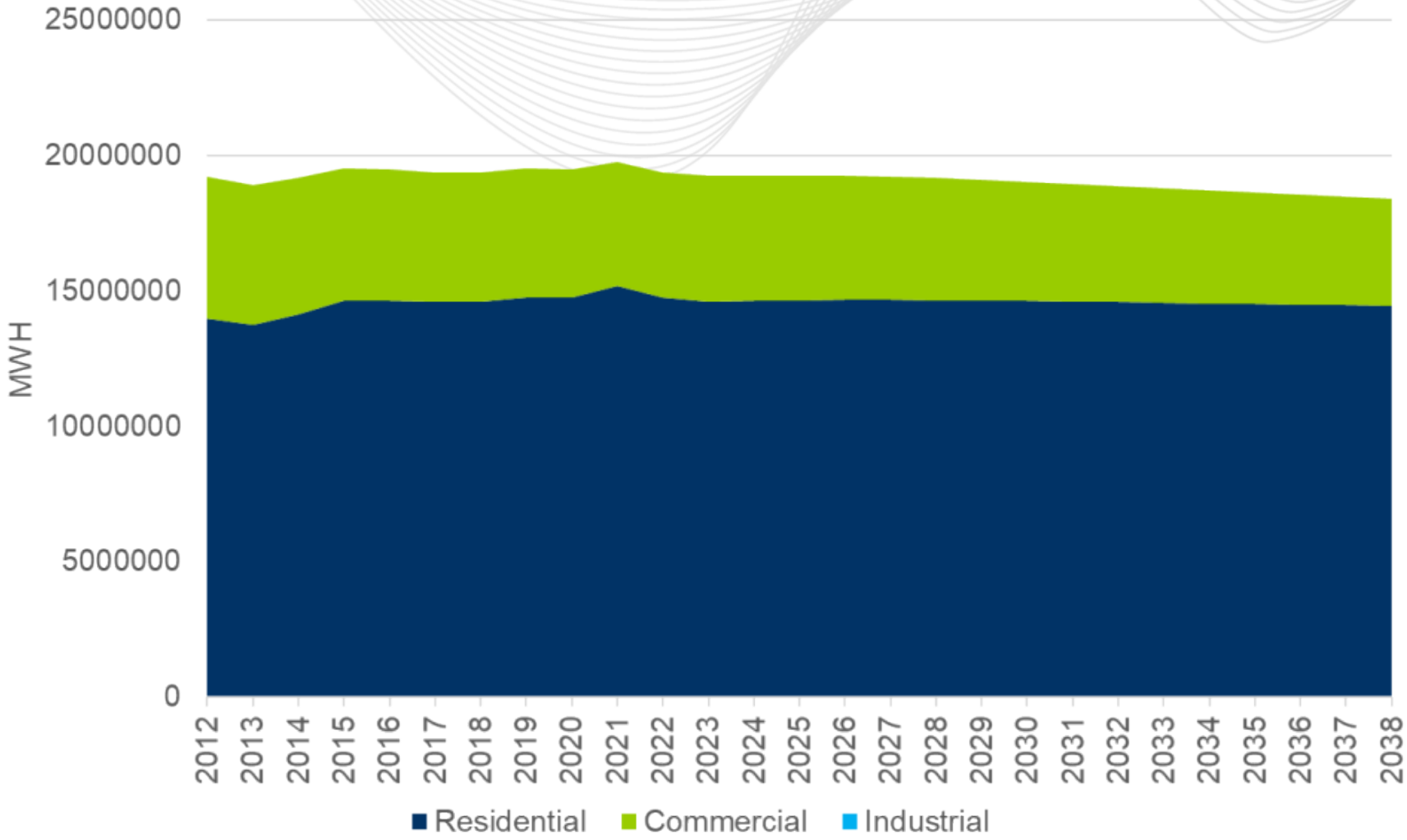
Heating



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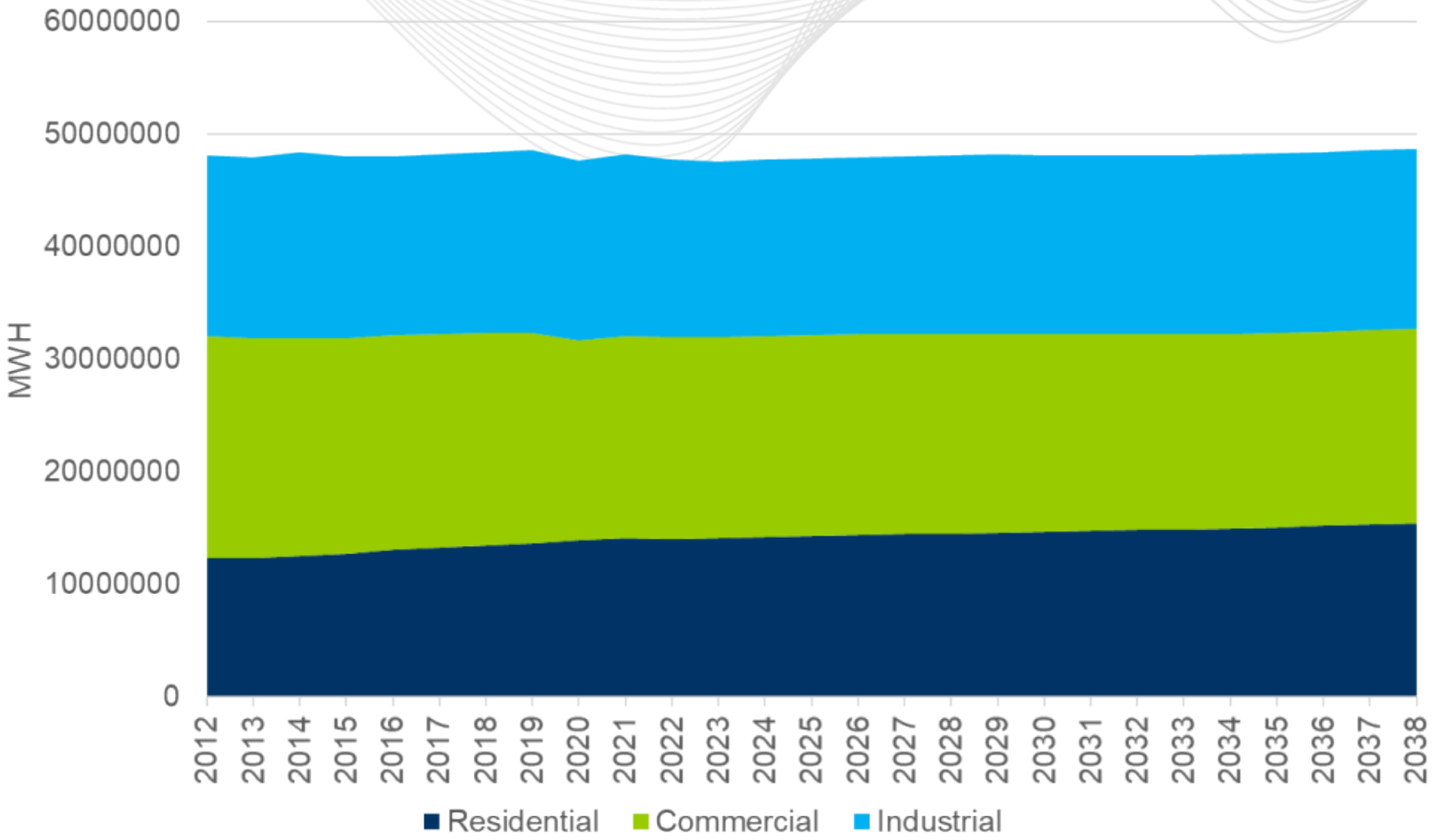
Other



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Plug-in Electric Vehicles

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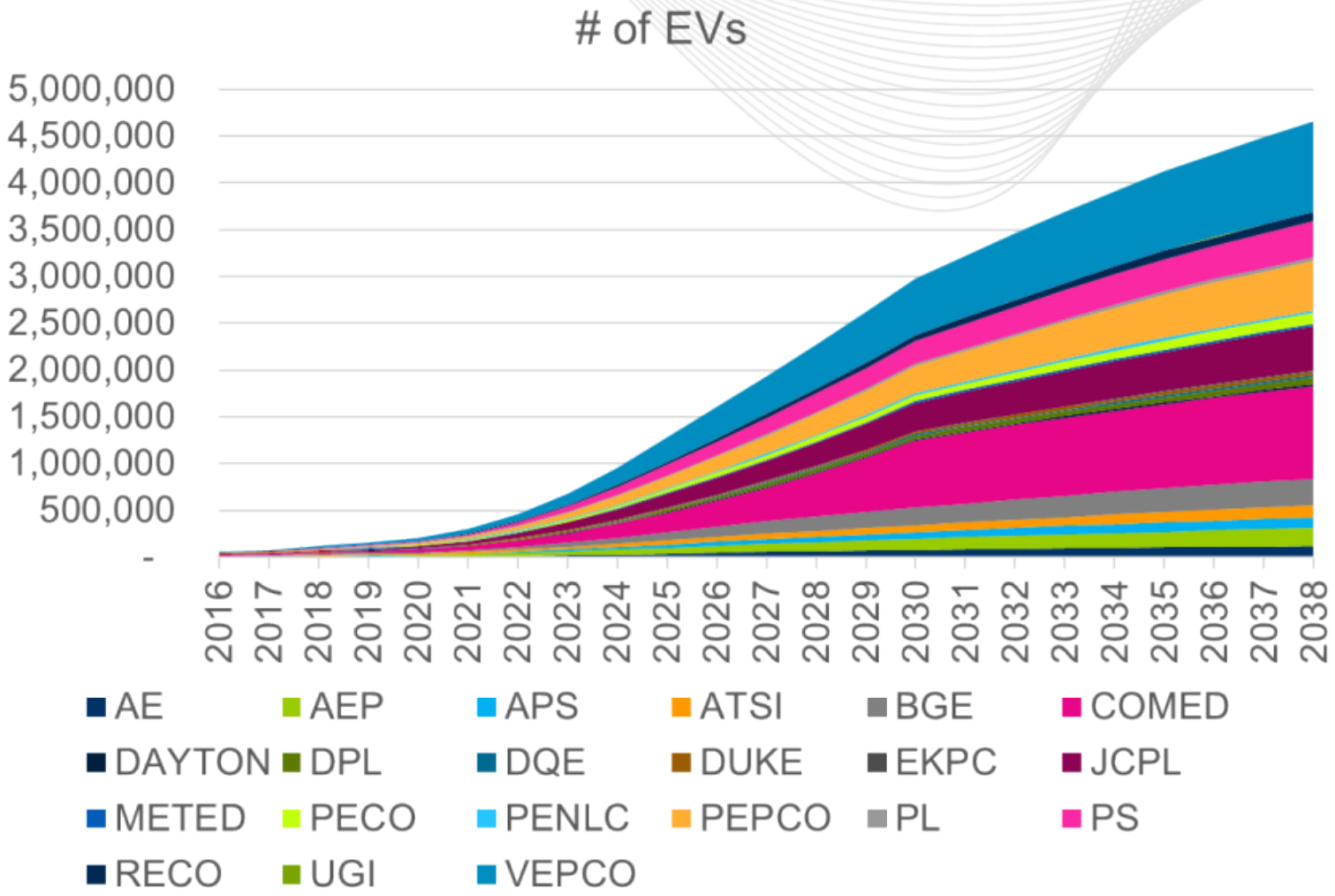
Electric Vehicle Forecast



- Calibrated to historical state registration data (2016-2021 from DOE) and/or county/zip data (IL, MD, NJ, PA, VA)
- Forecast driven by combination of state targets (DC, MD, IL, NC, NJ, and VA), and EIA assumptions

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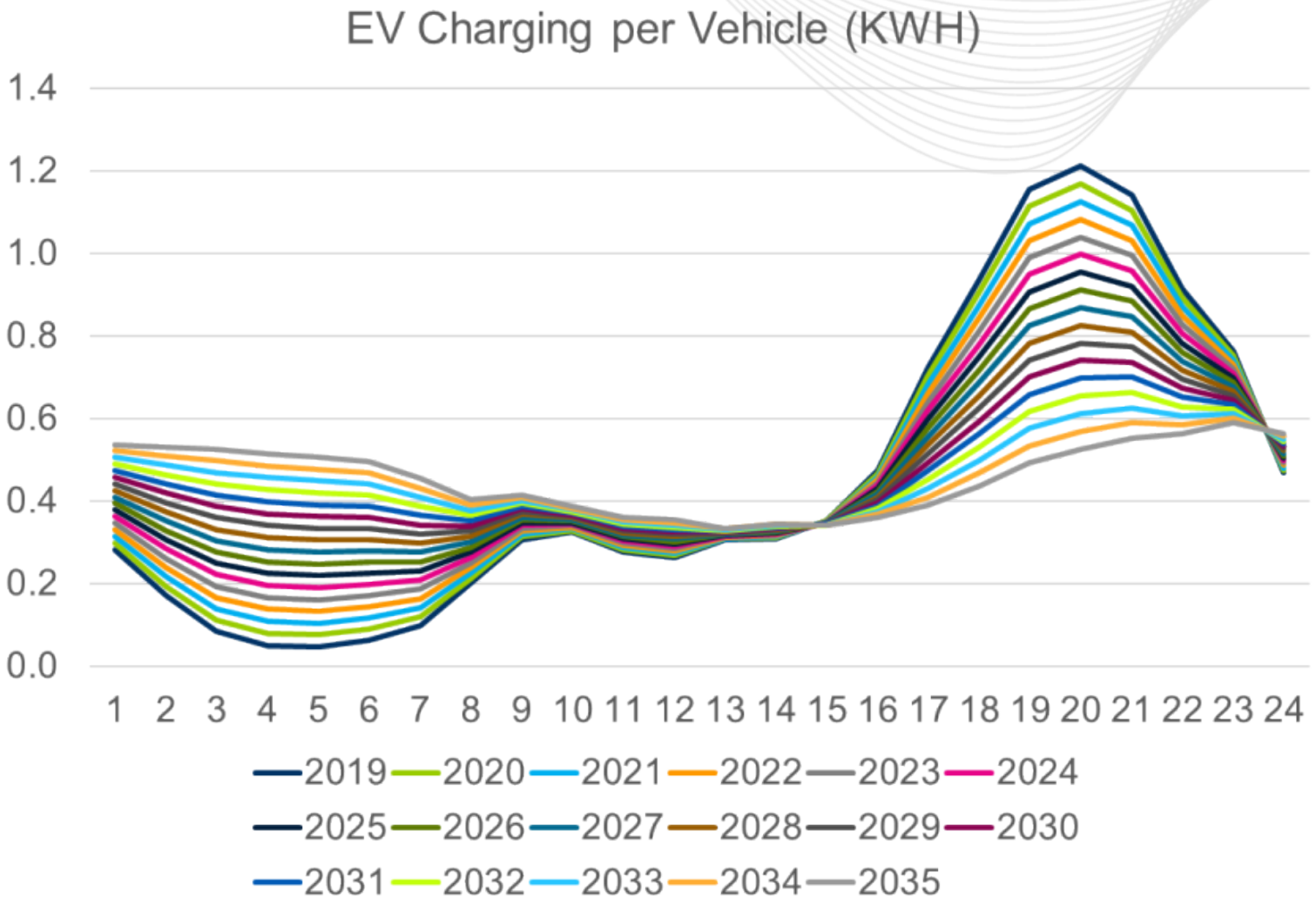
Electric Vehicle Charging Shape



- Over time blend charging strategy away from un-managed charging towards a more levelized charging that mitigates peak impact
- This is akin to current practice used in the 2022 Load Forecast to assume that steps will be taken to reduce the future peak impact of EVs.

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Forecast Adjustments

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Forecast Adjustments

- EDCs are encouraged to provide PJM with information about large changes that may not be captured in the forecast process.

- We view requests through the lens of:
  - Is the request significant?
  - Is there risk of double counting?
    - Is the trend likely captured in the economic forecast?
    - Can the trend be removed from the history?

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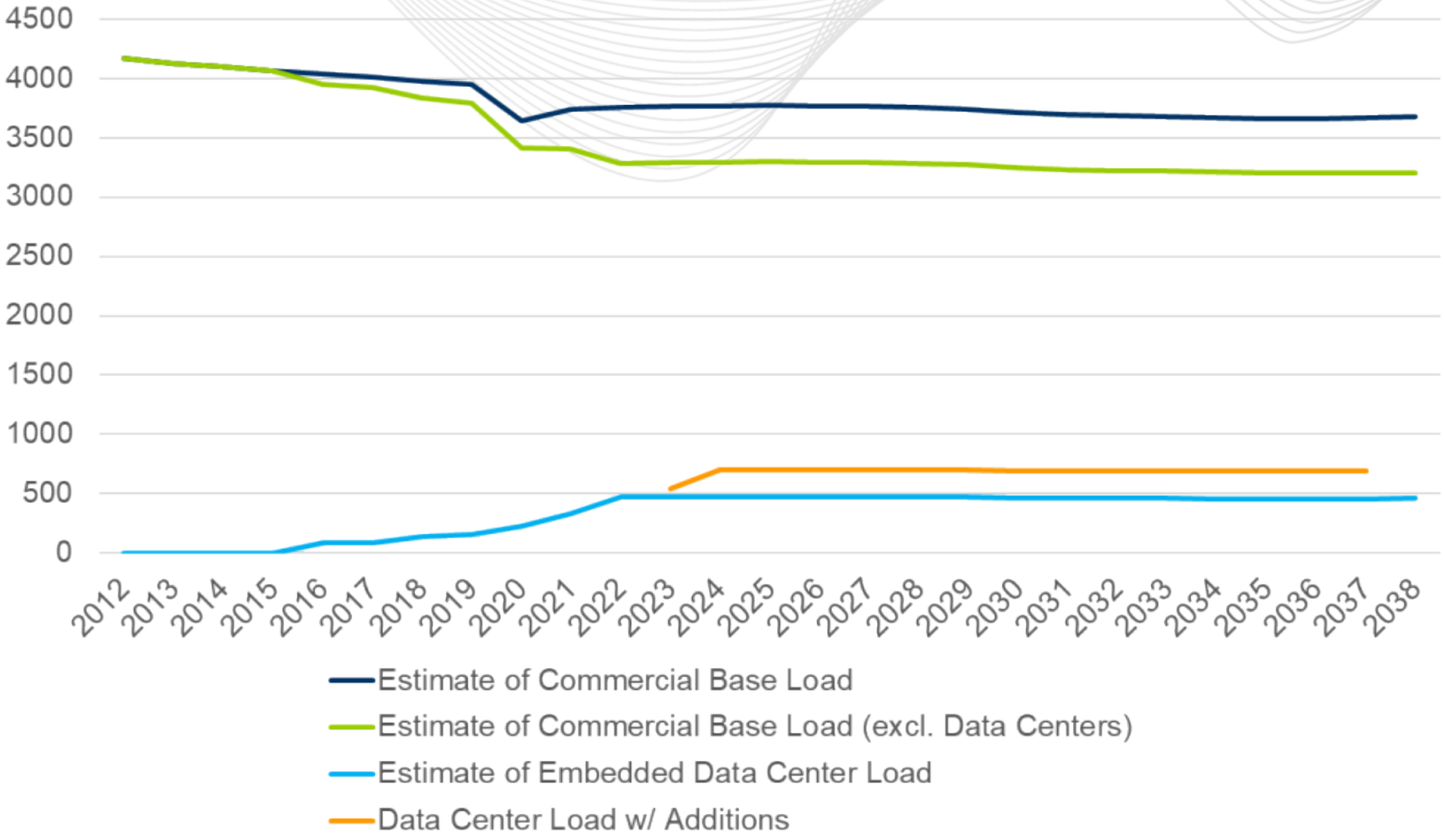
AEP – Data Centers



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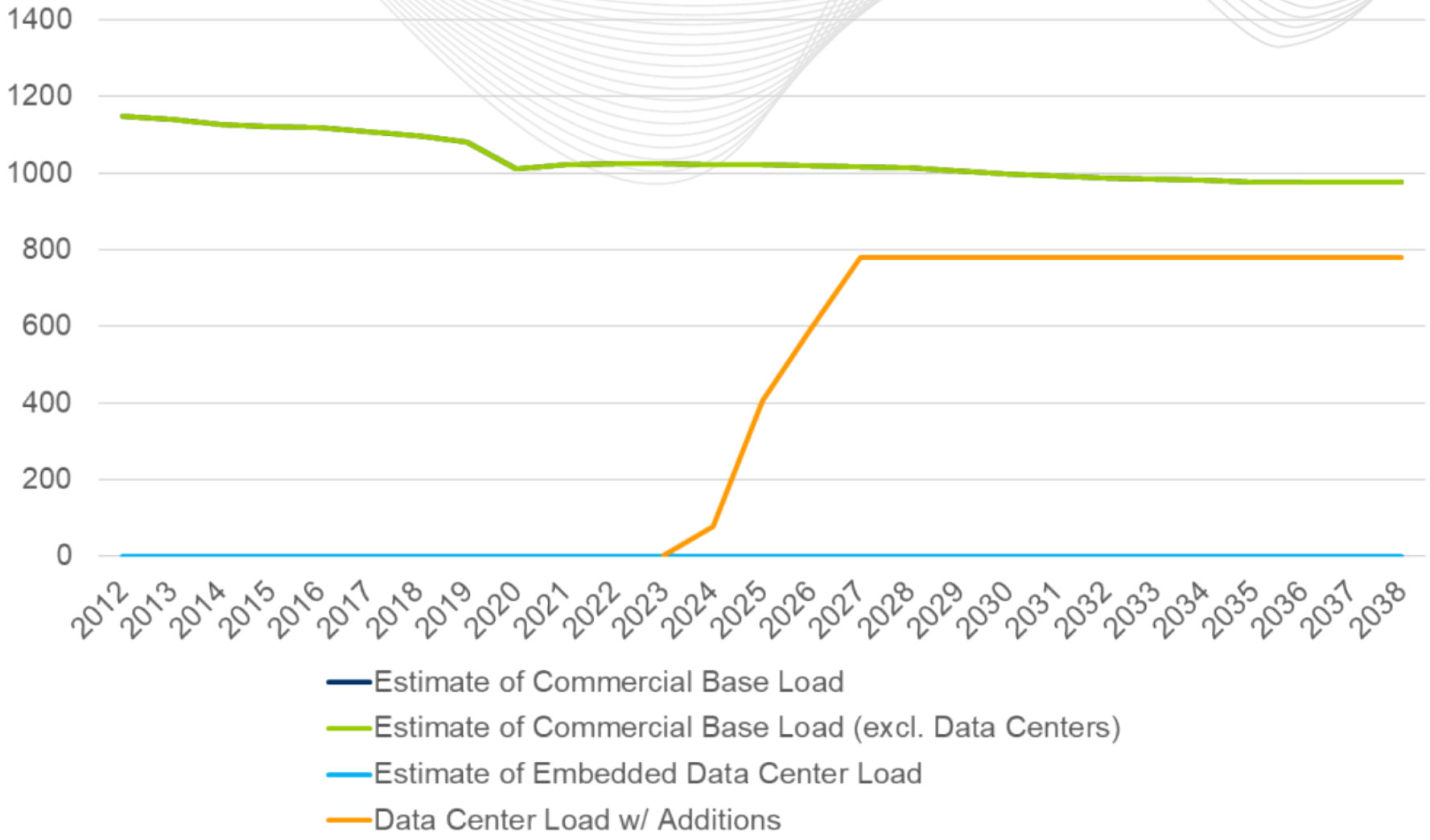
APS – Data Centers



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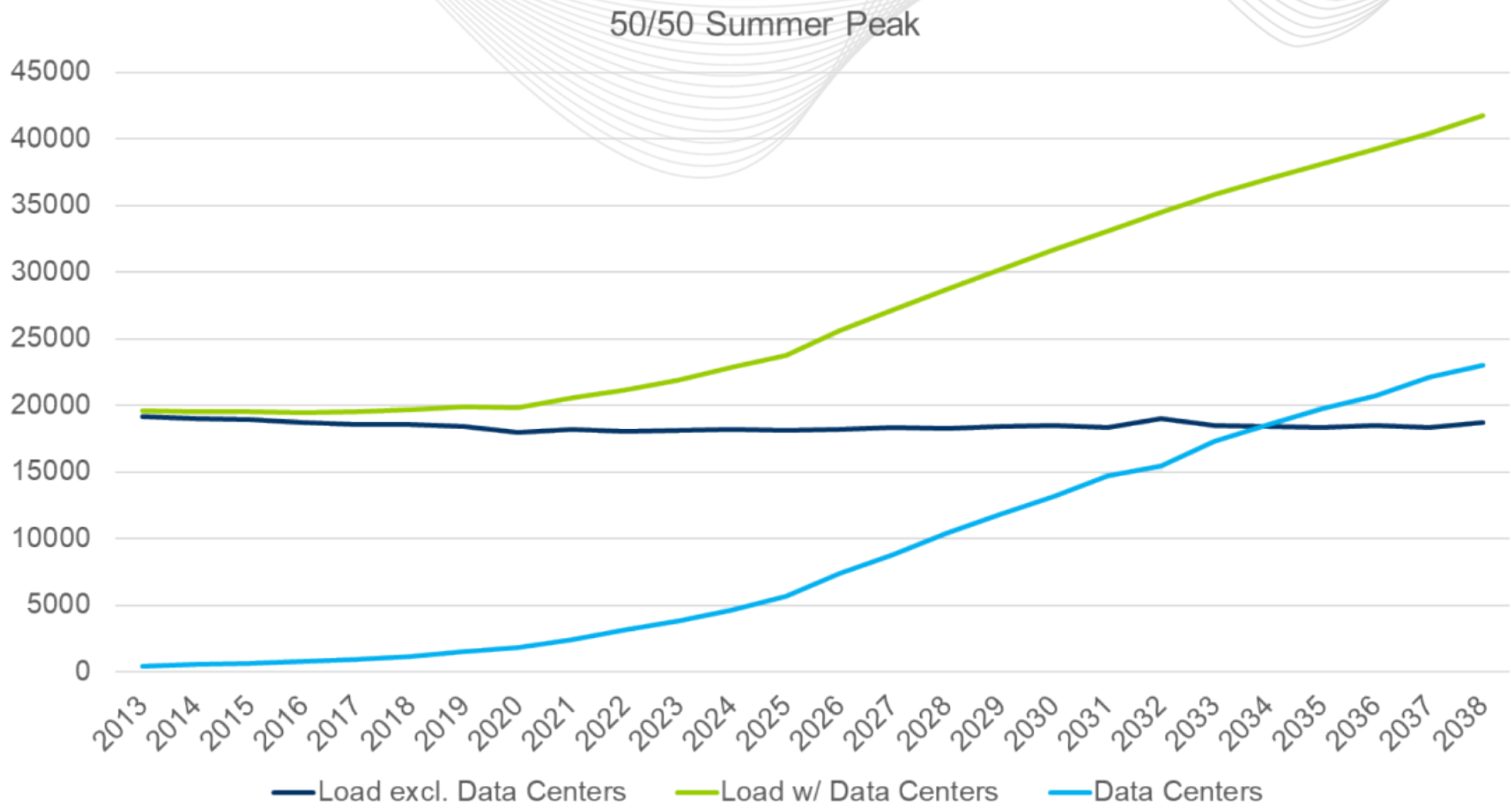
Dominion – Data Centers



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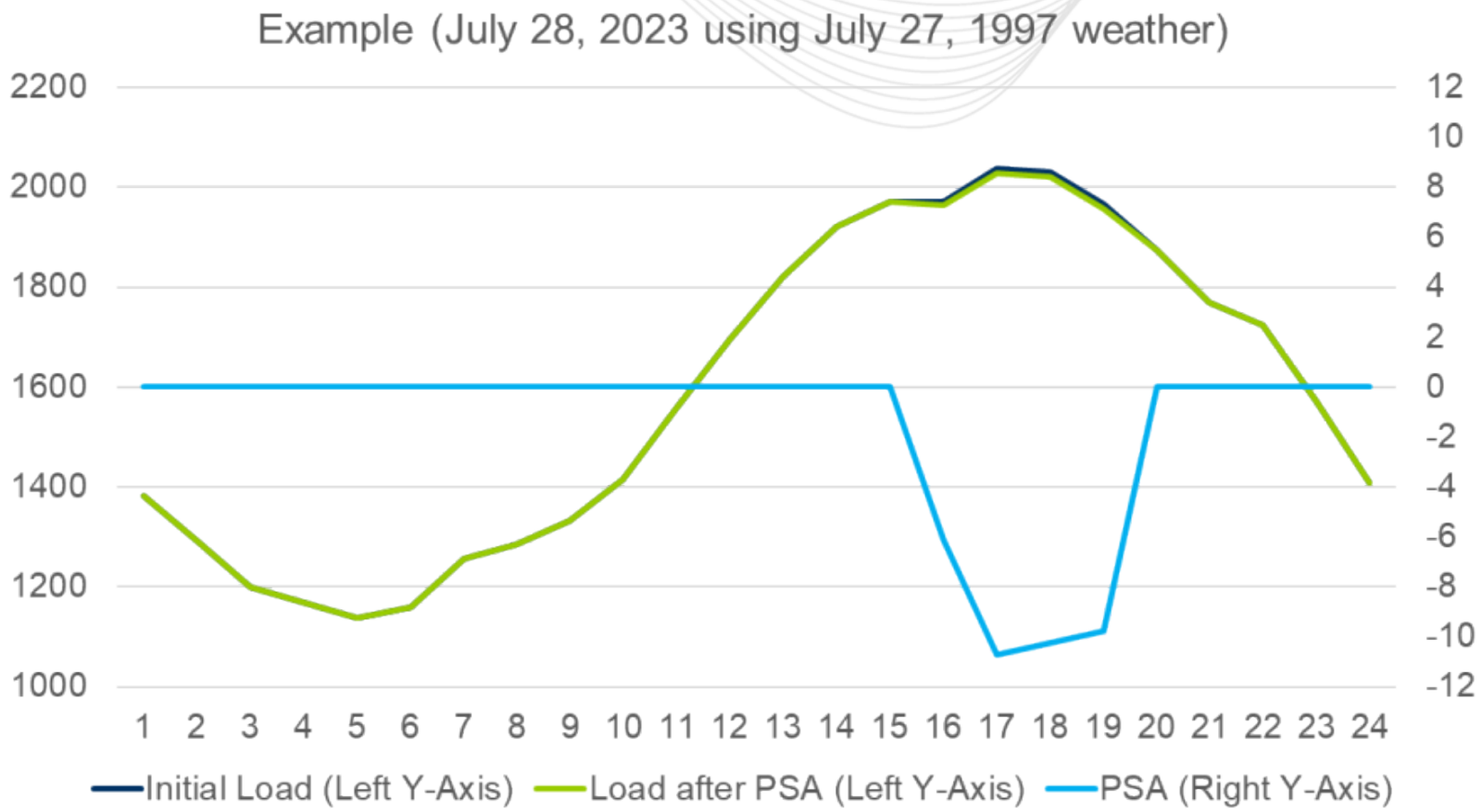
EKPC – Peak Shaving Adjustment



- Peak shaving adjustment gets applied based on days that exceed a THI trigger.
- In this example day, peak load is lower by 10 MW due to the PSA

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NRBTMG to DR

- PJM was notified of existing NRBTMG that are transitioning to participate as Demand Response starting in 2023

- For the 2023 Load Forecast, these zones are adjusted upward to facilitate these resources' participation in RPM
  - AEP: 18 MW
  - ATSI: 55 MW
  - PPL: 25 MW

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Preliminary Forecast

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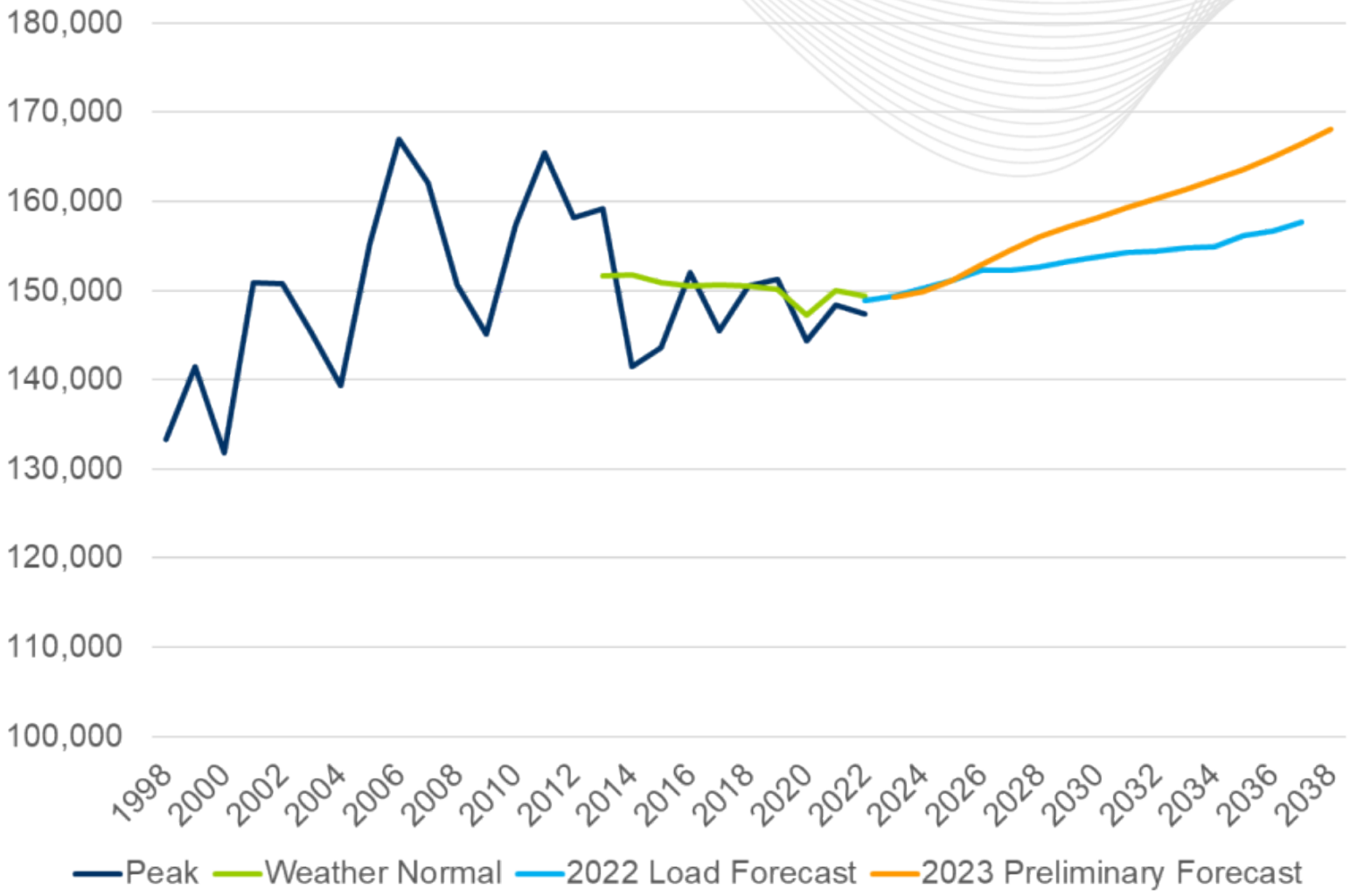
Summer Forecast Comparison 2022 vs 2023



- 15-year Annualized Growth Rate
  - 2022 LF: 0.4%
  - 2023 Prelim: 0.8%
- Select year comparisons (2023 Prelim vs 2022LF)
  - 2026: +0.5%
  - 2028: +2.2%
  - 2037: +5.6%

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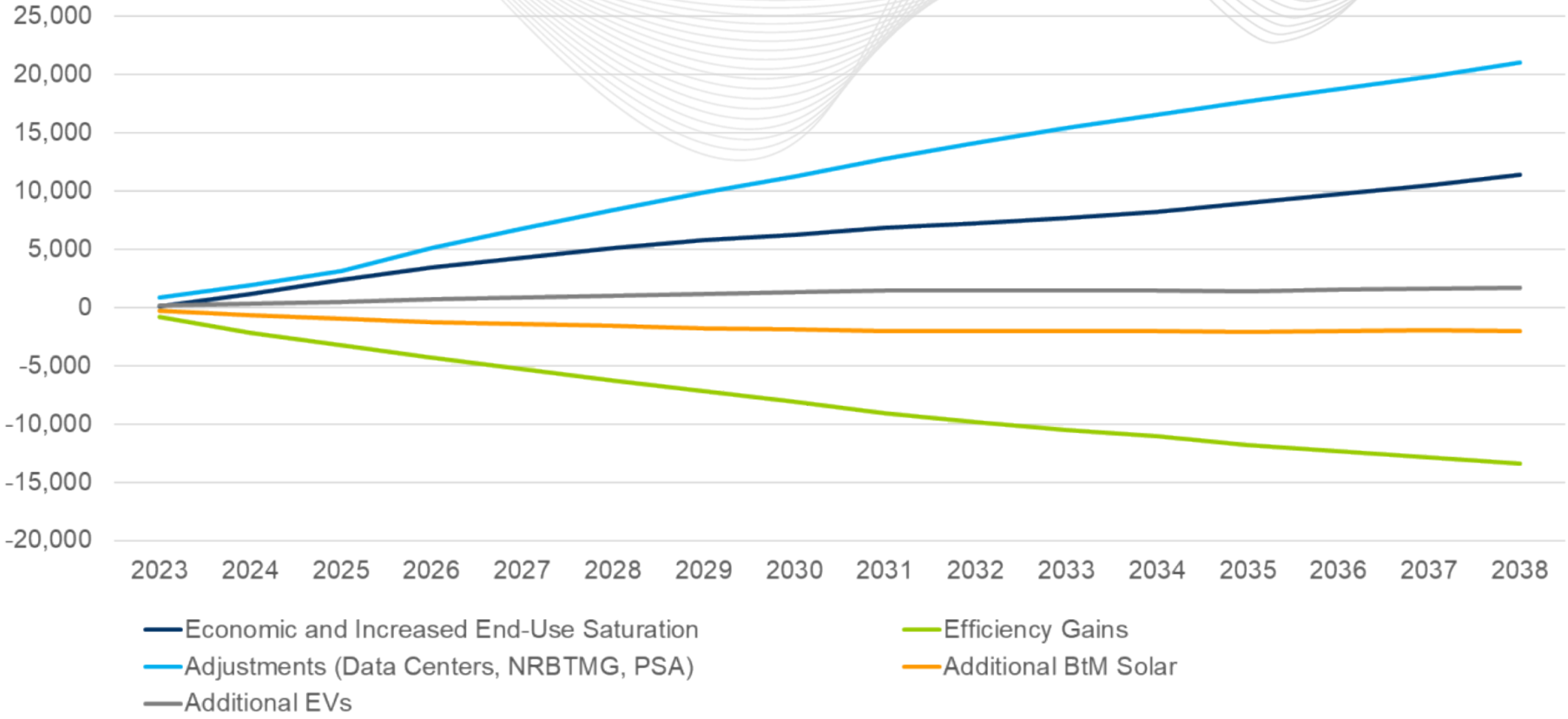
Summer Forecast Flow – Additions and Subtractions



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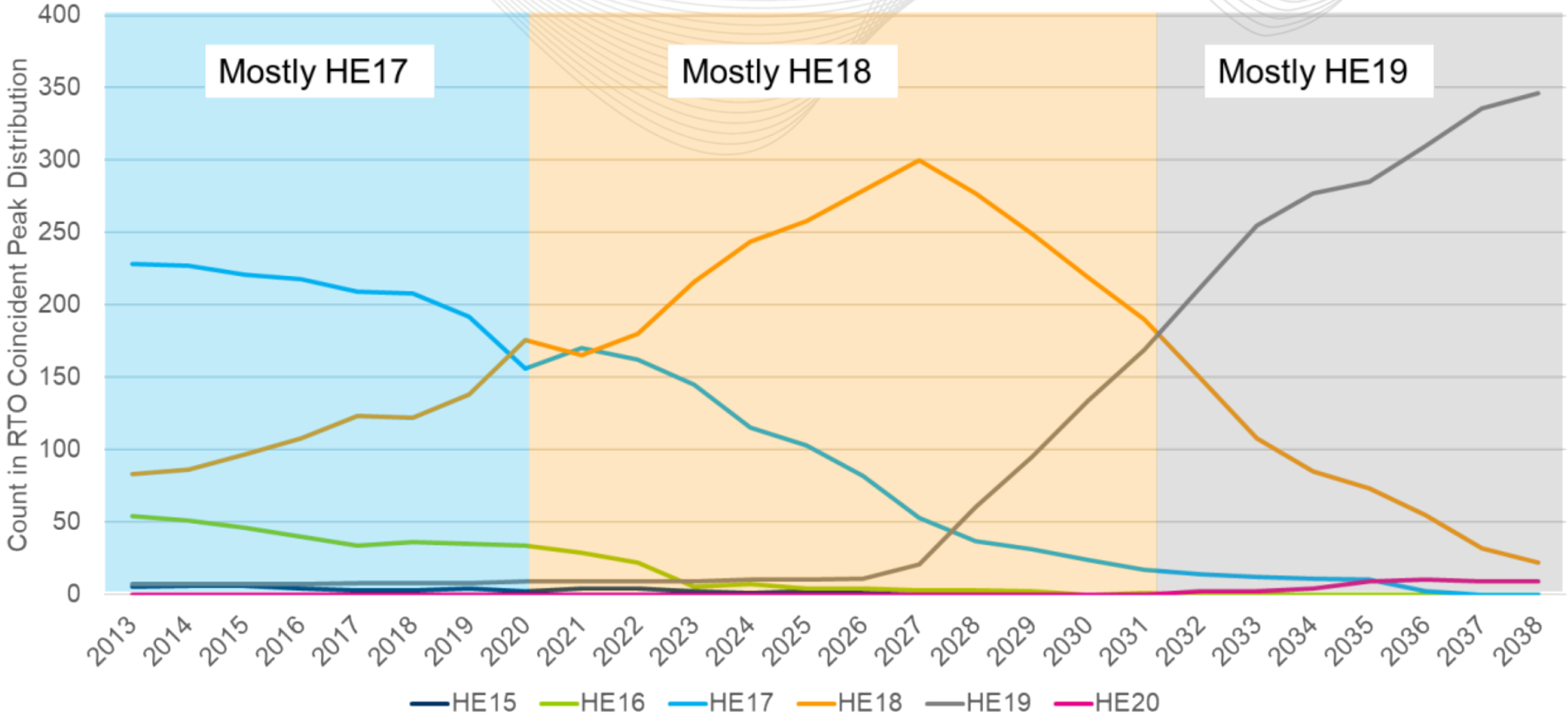
Summer Forecast – Peak Timing



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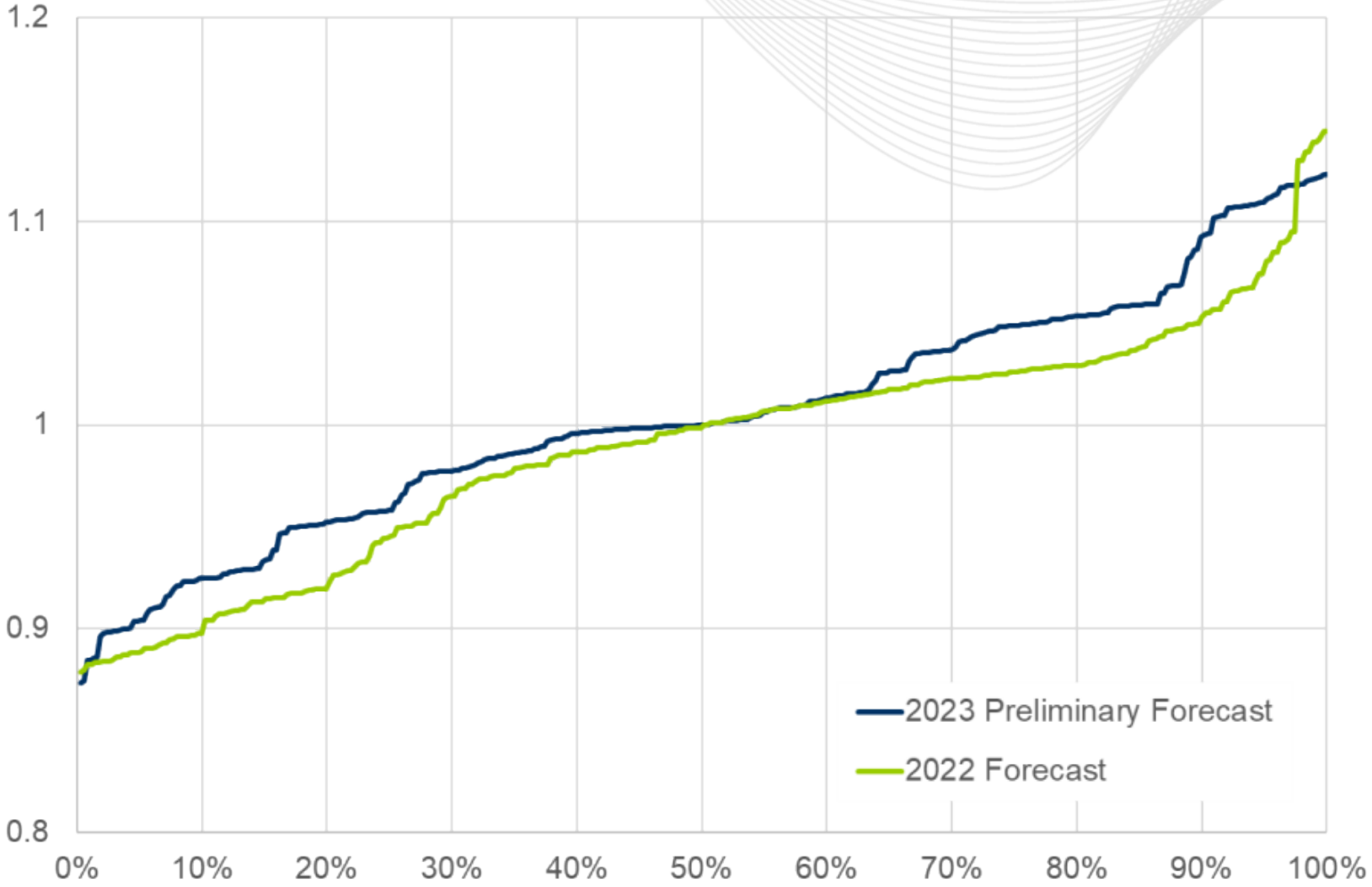
2026 Summer Peak Distribution Comparison
50/50 Forecast = 1.0



2023 Load Forecast used weather simulation of 1993-2021 to construct distribution compared with 1994-2020 in 2022 Load Forecast.

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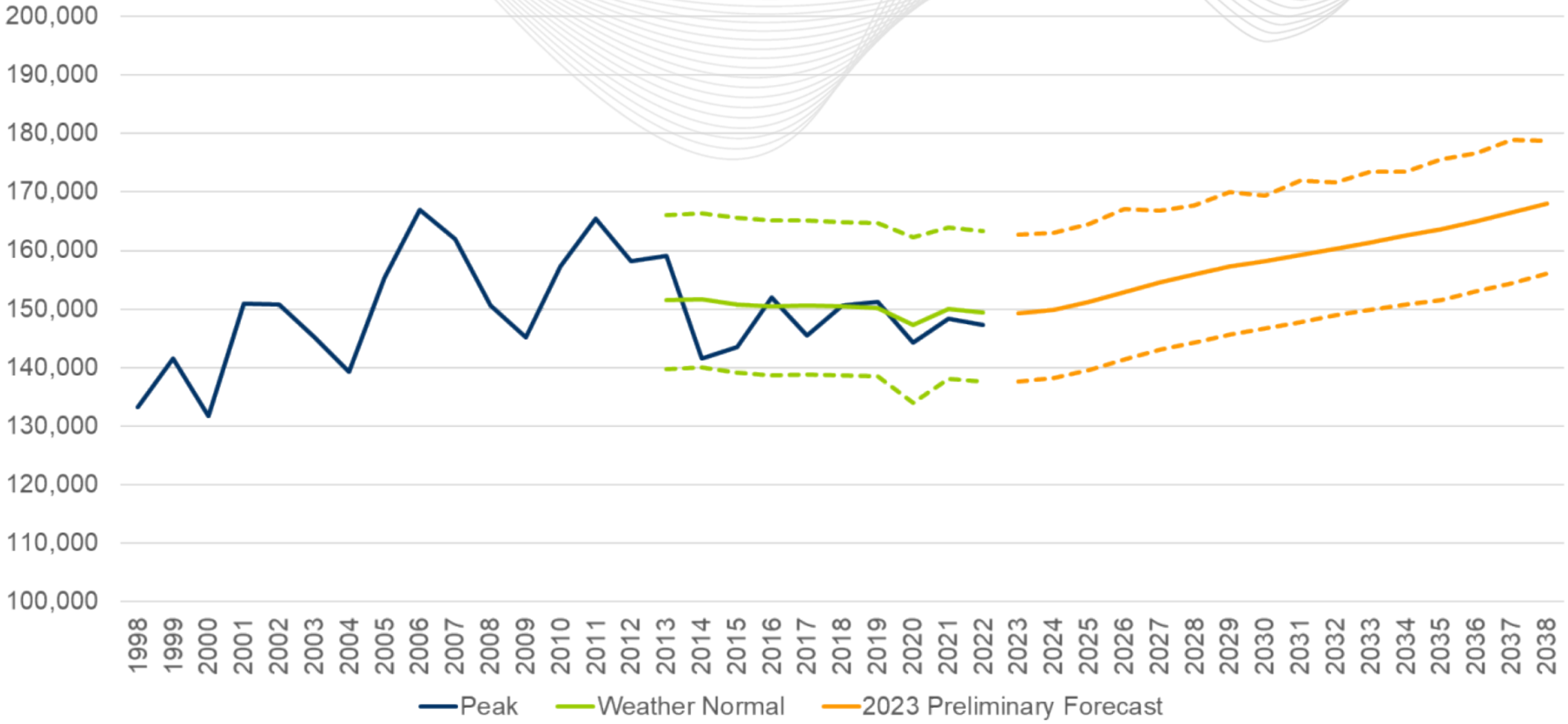
2023 Preliminary Summer Forecast w/ 10th and 90th Percentile Weather Bands



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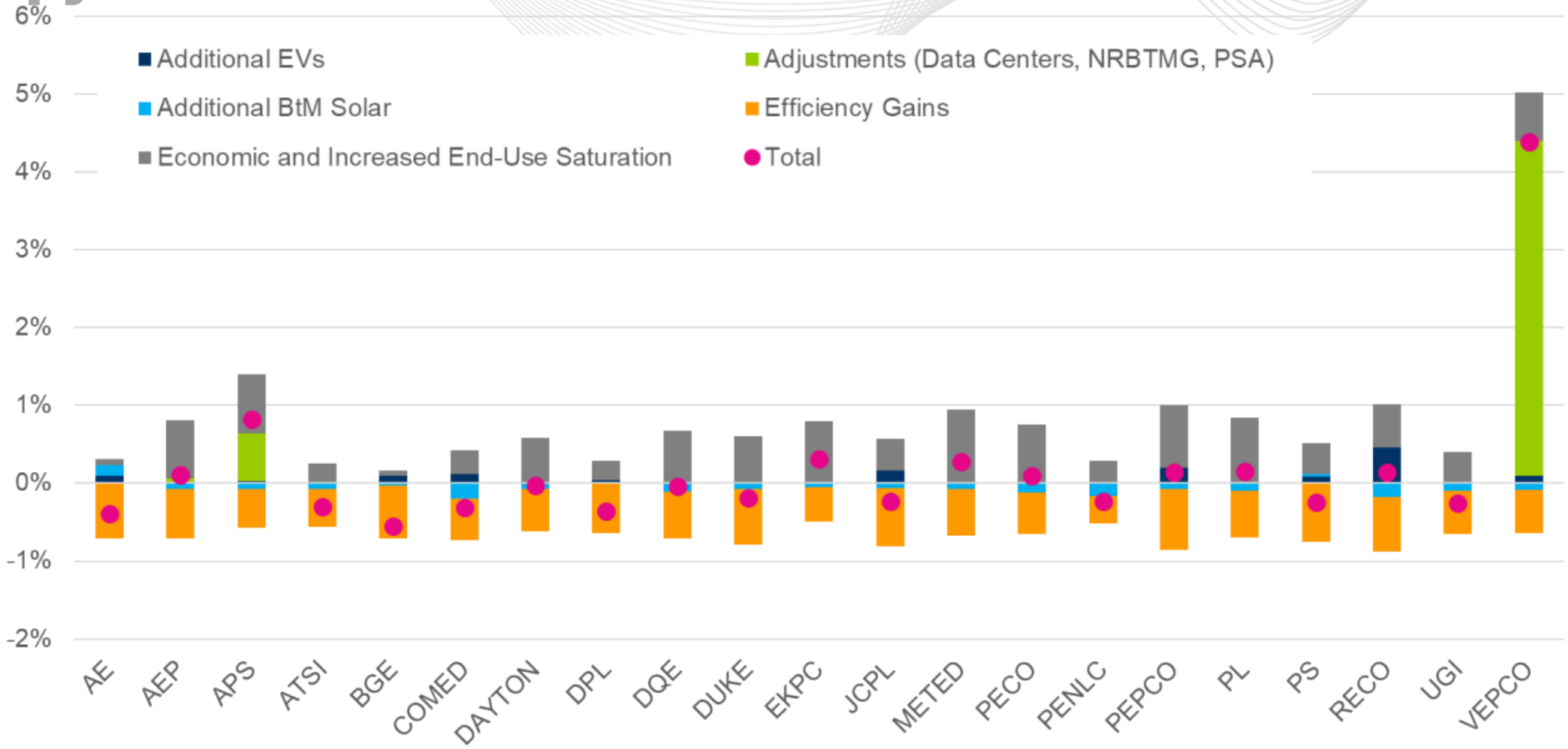
Summer Peak Average Annual Growth (2023-2038)



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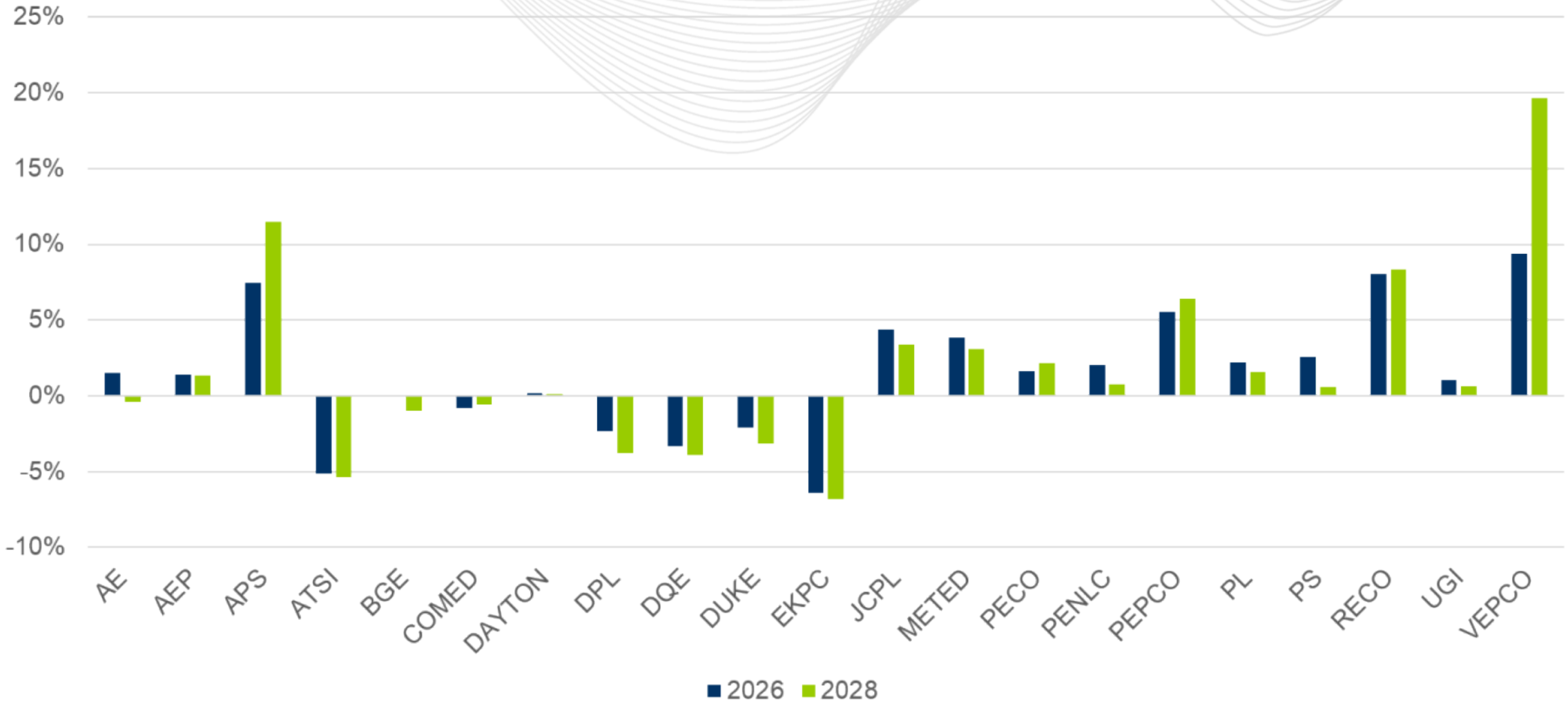
Percent Change in Summer 50/50 Forecast
2023 Preliminary vs 2022 Load Forecast



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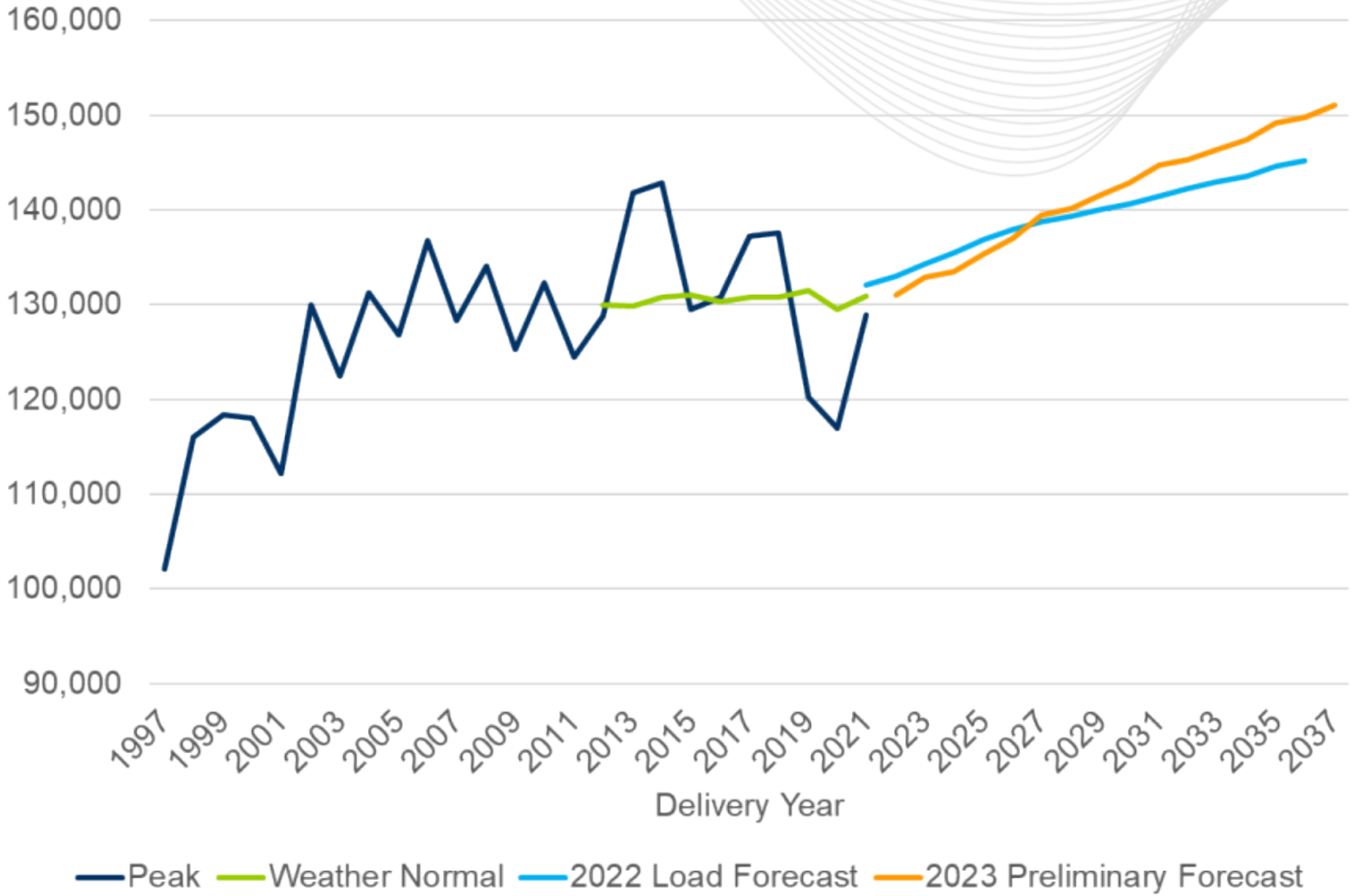
Winter Forecast Comparison 2022 vs 2023



- 15-year Annualized Growth Rate
  - 2022 LF: 0.6%
  - 2023 Prelim: 1.0%
- Select year comparisons (2023 Prelim vs 2022LF)
  - 2026: Down 0.7%
  - 2028: Up 0.6%
  - 2036: Up 3.2%

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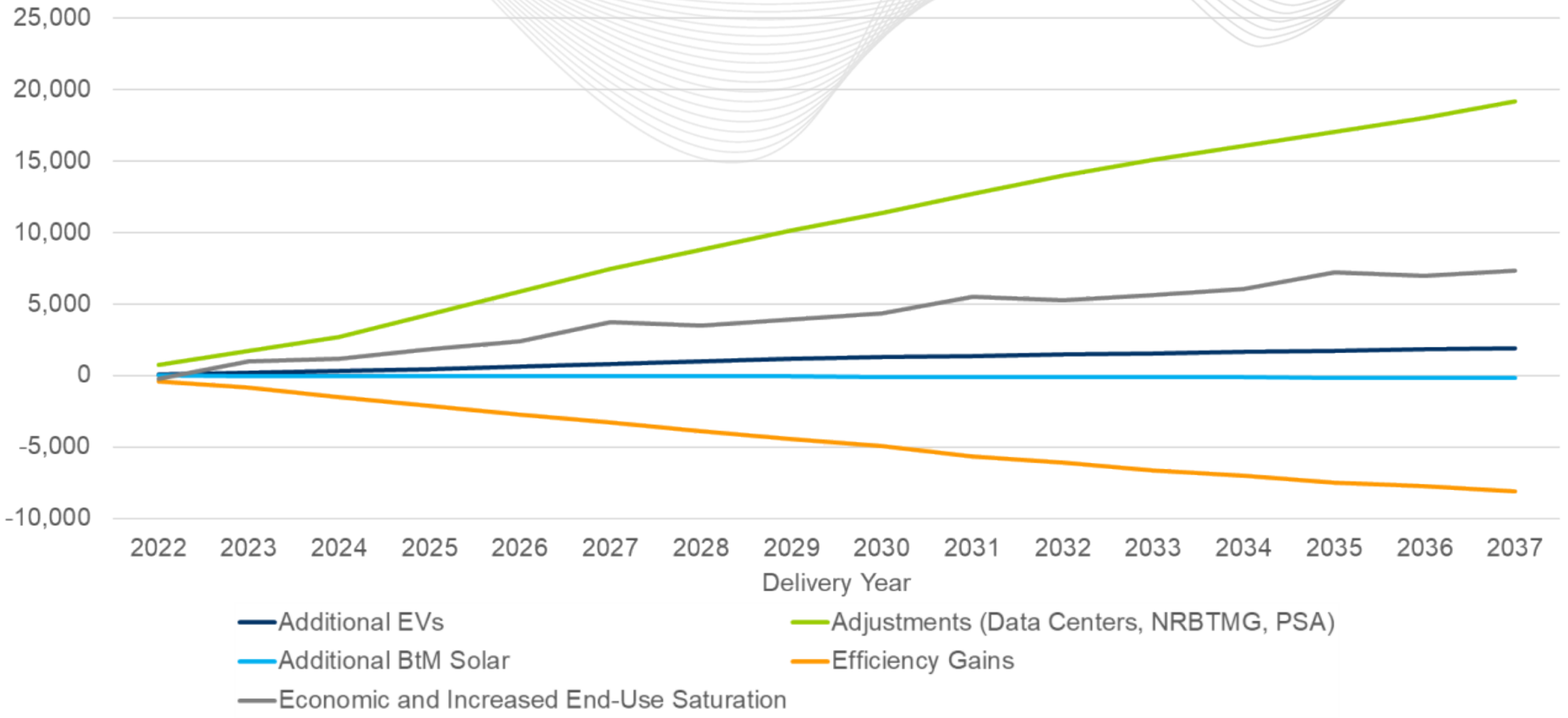
Winter Forecast Flow – Additions and Subtractions



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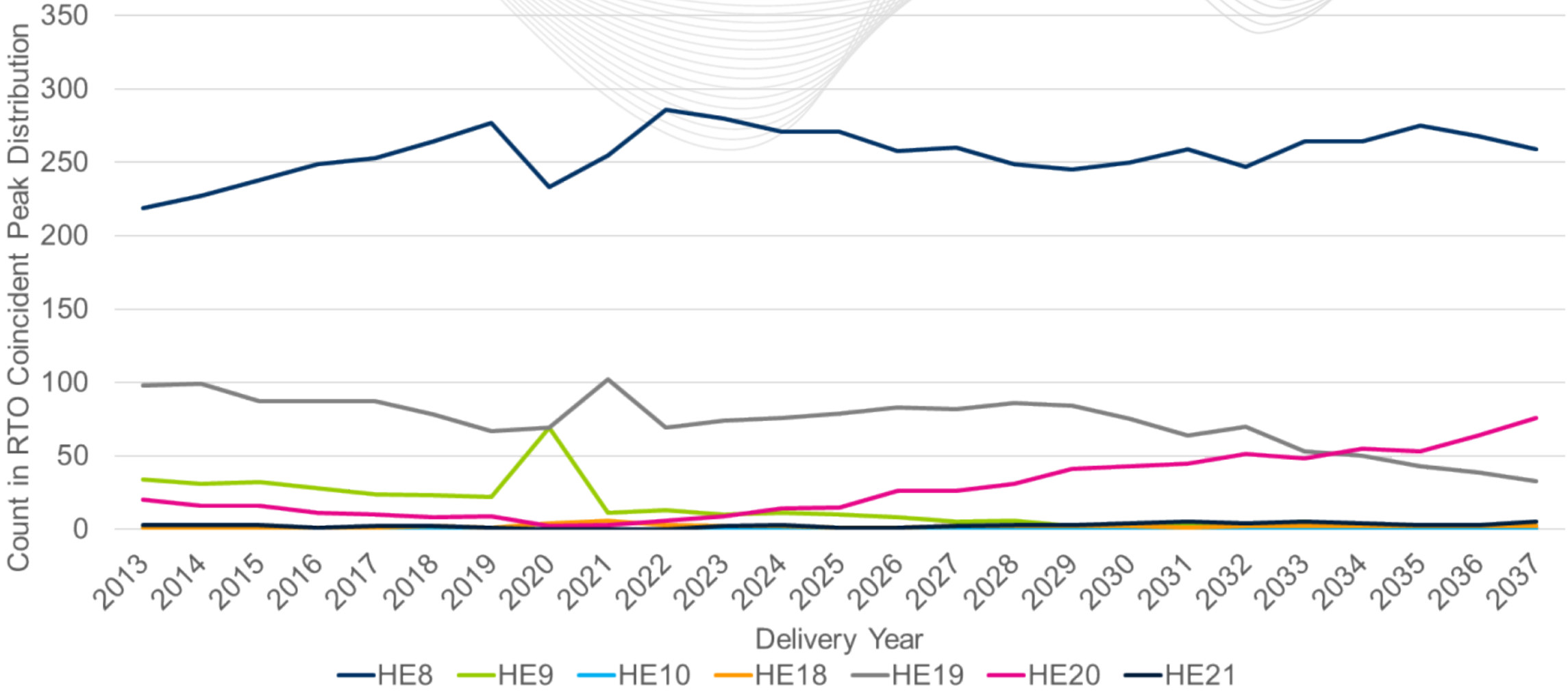
Winter Forecast – Peak Timing



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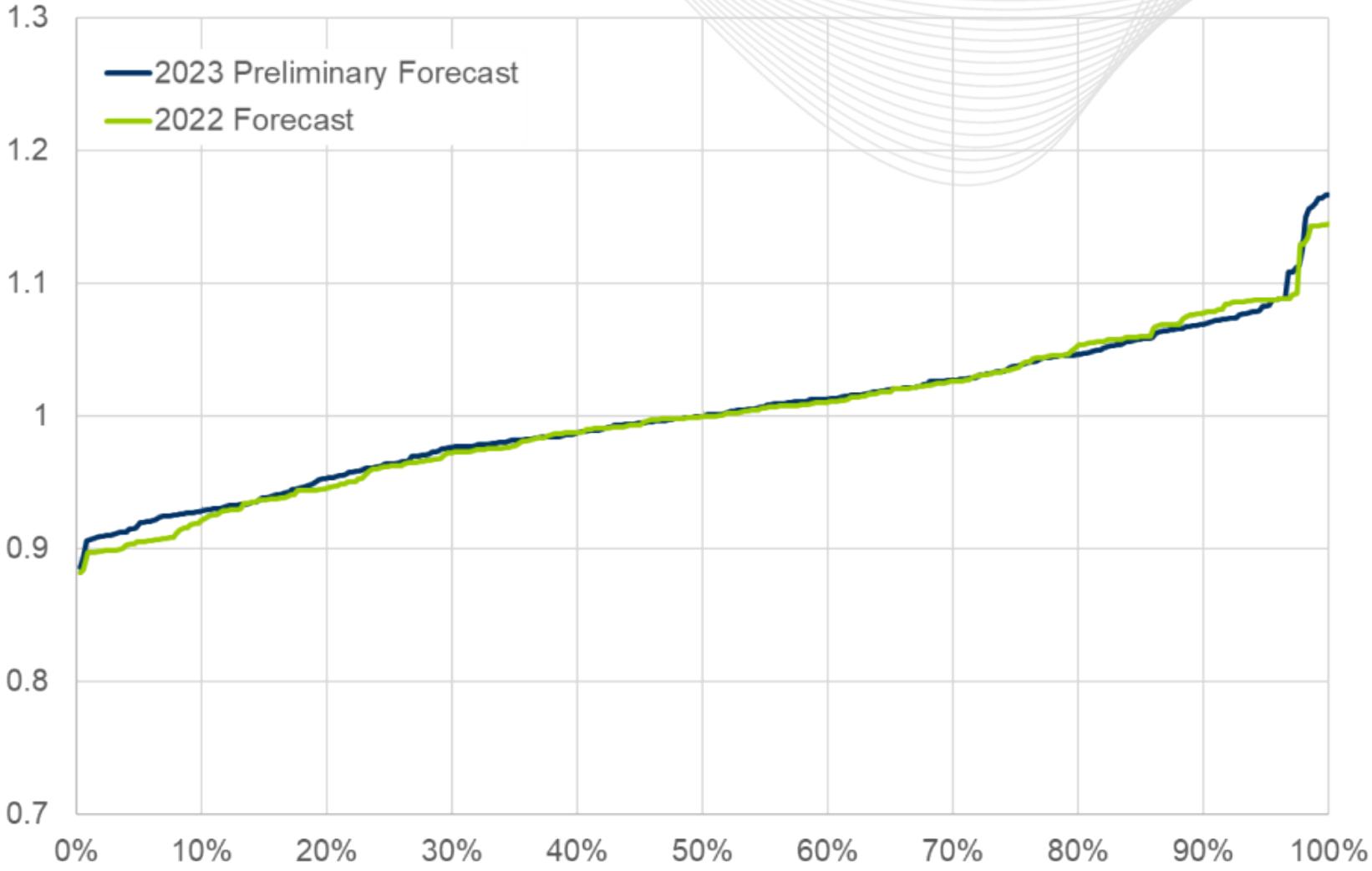

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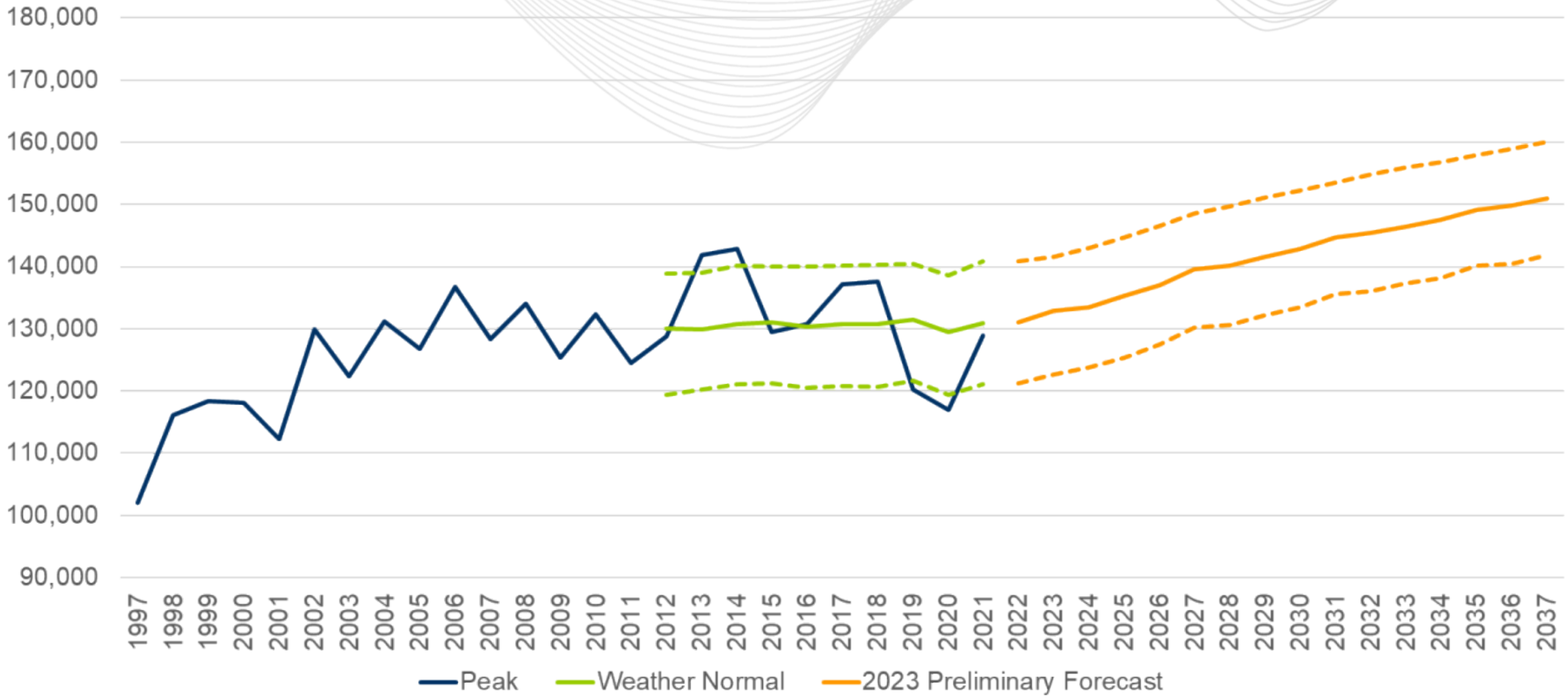
2023 Preliminary Winter Forecast w/ 10th and 90th Percentile Weather Bands



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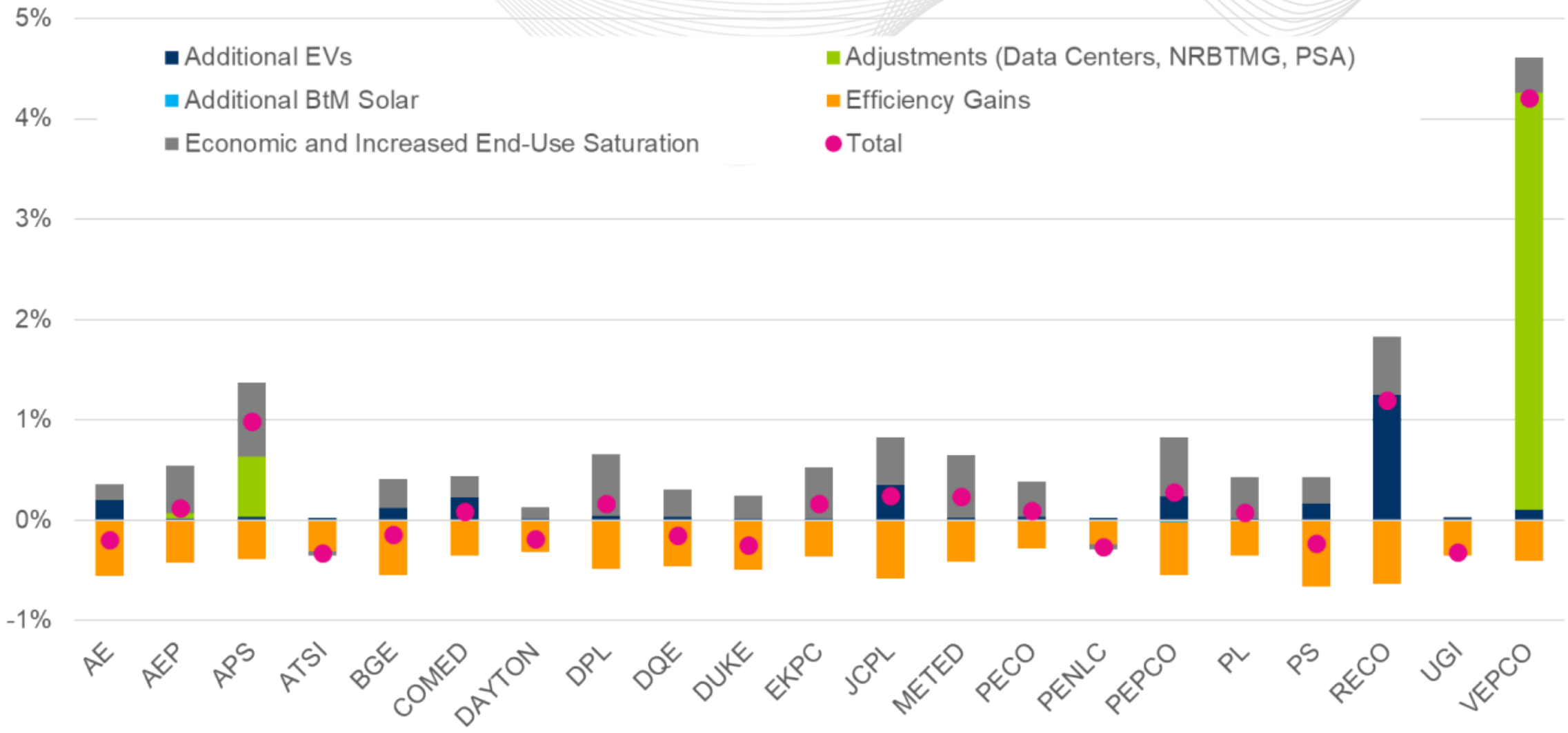
Winter Peak Average Annual Growth (2022-2037)



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Percent Change in Winter 50/50 Forecast
2023 Preliminary vs 2022 Load Forecast

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Areas of Focus in 2023

- Review appropriateness of assumptions used in the weather simulation process and discussion of climate change.

- Continue development on forecast assumptions
  - Electrification (e.g. state policy)
  - Exogenous forecast adjustments

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Next Steps

- Review with Planning Committee (12/6/2022)
- Publish final report in late December
  - Accompanying spreadsheets
    - Unrestricted Loads
    - Model Details Spreadsheets
    - End-Use Indices
    - Weather Variables
    - Statistical Appendix
  - Load Report Supplement

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Contact

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2023 Preliminary Load Forecast

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